Study of Construction Project Integrated Management Based on Stakeholders

Li Juanfang[1], Liu Xing[2]

School of Civil Engineering, Wuhan University

lijuanfang@126.com

xliu_whu@163.com

Abstract-**For the drawbacks of traditional construction project management, the paper gives out a method of the combination for the systematic and integration. Based on a brief introduction for the theory of construction project integrated management, it furthers to specifically illustrate the integrated management methods in the construction project as well as to analyse the implementation practice, which offers a reference for innovation and development of construction project integrated management.**

Keywords-stakeholders; construction project; integrated management

I. INTRODUCTION

Currently, the construction project is more and more large-scale and complex, as to this development situation, a new management style is urgently needed. Construction project integrated management proposes a new development direction for architectural engineering. Integrated management is the process which applies the integration theory and methods, models, tools of systems engineering to integrate systematically the related resources of construction project management and achieves the settled objectives and maximizes the investment returns[1][2]. As the participants of construction project are more and more extensive, so that the construction project integration management system is also more complex. Then the isolated and decentralized project management and decision-making methods no longer meet the requirements of today's new projects. It's a the new issue about how to mobilize the power of the parties effectively, how to implement the integrated management on the process of construction project, and how to improve the maximize value projects to the owners.

II. THE DRAWBACKS OF TRADITIONAL CONSTRUCTION PROJECT MANAGEMENT

The traditional project management lacks of systematic thinking and doesn't analyzes the project from the perspective of the overall objective, construction project management, design project management and implementation project management are separated. Because of their management subjects are different and have many communication obstacles, all stages information of the project can not be delivered timely and communicated, the various stages content of construction project is separated, isolated and static, the phenomenon of information content shortage and false at the exchange are abound. So that the engineering solutions are changed continuously in the future building process, the works of the implementation process are cross-confusion; these often make the project out of control. Therefore, the control objectives of the project are often trade-off, it's difficult to ensure the smooth realization of the project objectives [3][4].

At present, the increasingly large-scale and complex of construction project, the above shortcomings of project management are more and more obvious, so changing the traditional management thinking and using systematic and integrated idea to study and solve the issues of construction project management become a good way.

III. THE THEORETICAL FOUNDATION OF CONSTRUCTION PROJECT INTEGRATED MANAGEMENT

A. The Meaning of Construction Project Integrated Management

Construction project integrated management is a high efficiency project management model based on information technology that according to the characteristics of project management, applying system engineering principles, considering synthetically requirements and convergence of all stages of the construction project life-cycle, the various elements of project management, and the dynamic effects relationship among the parties in the process of the project implementation, the coordination and overall optimization of the involved parties[5].

Construction project integrated management requires to consider multiple constraints of the project life-cycle systematically from the start-up phase, clear the parties, especially the involved affects and dependencies among the various suppliers, subcontractors and so on, which has not been included in the original project system, provides a suitable platform for communication and coordination, forms a dynamic and efficient project organization by the improved information technology, clears and balances the relationship among project objectives, realizes the project goal comprehensively, makes stakeholders satisfactory, and achieves the win-win goal of project participants.

B. The Content of Construction Project Integrated Management Based on Stakeholders

Construction project integrated management based on stakeholders is all stakeholders of the project which include contractors, design institutes, subcontractors, suppliers, supervision, project owners, government departments, cost company, bidding agents, etc., in the conditions of balanced all interests, establishes a project management company as the supervision and coordination center, improves coordination and communication mechanisms to achieve a reasonable sharing of risks and the amicable settlement of the contradictions[6]. The main management content includes three aspects: the integration of the parties, the integration of

the various stages and the professional integration [7]. The integration of the parties is to break the traditional organization boundaries and integrate all parties of the project; it's the tissue protection to build an integrated team, and also the basis for all stages integration and the professional integration. The integration of the various stages is that the work of the project stakeholders covers the whole life-cycle. The professional integration is that the member of the project stakeholders covers all different professions, it makes the team members of different professions to communicate information with each other directly and reduces the transmission distortion; at the same time, the team members can share their professional knowledge and experience, which is conducive to mutual trust.

C. The Features of Construction Project Integrated Management Based on Stakeholders

The three aspects integration of project stakeholders make it have the characteristics of the leading of owners, the dynamic of members and the complexity of information exchange. Such as figure 1.

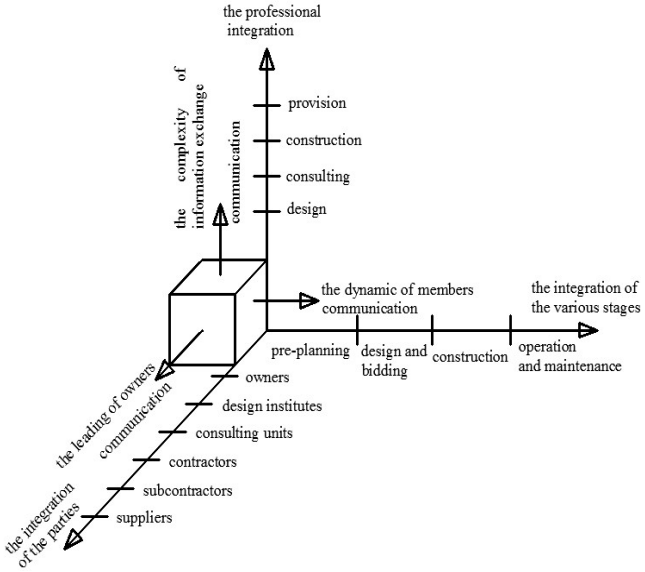

Fig. 1 Construction project integrated management and its features

1) The leading of owners: Project decision power is in the hands of the owners, the choice of the participants is entrusted by the owner or by an advisory body to develop selection criteria. Although there is a neutral third party as a moderator that presides the work of the regular meetings, improves communication and deals with disputes in the project implementation process, but the owners is the owner of the project, and is also the only party who experiences the life-cycle of the project, So the target of the owners largely determines the overall objective of the project, it's a mean that considering the interests of all stakeholders to achieve the overall objective of the project, because many of them are the perpetrators of the project, caring the objectives of the participants appropriate under the condition of ensuring the overall objective will help the implementation of the project.

2) The dynamic of members: The team members are dynamic during the different stages of the whole life-cycle of the project [8]. Early in the project planning stage, the owners and consulting units may be the only participants. After entering the design phase, the design unit becomes a major participant; the contractor can also enter teams in this stage and provide the comments and suggestions for the design work, so that the design can be more constructability. During the construction, subcontractors and suppliers join the team and cooperate with other teams who joined before; As the promoting of the project and the approach of the completion, some subcontractors and suppliers who have completed their contractual obligations will withdraw from the project team. When the project enters into operation and maintenance phase, the consulting unit and design unit will gradually withdraw from the project team; after the expiry of the defect notification, the contractor will also exit the project team, until the owners take over the completed project and operate the project. At this time, there is no need for the project team and it will be dissolved.

3) *The complexity of information exchange:* The open and transparent information is very significant for the success of the project, and because of different stages and different expertise of the involved stakeholders, it exists information exchange of varying degrees among them. The information is large amount, type complex, wide and variety sources, scattered storage, and always in dynamic changing, so it is very complicated to exchange the information. Point to point communication exchange between the participants often leads to "Information Island", low working efficiency, information loss and information transmission delay and other issues.

IV. THE PROCESS ANALYSIS OF CONSTRUCTION PROJECT INTEGRATED MANAGEMENT BASED ON STAKEHOLDERS

A. Stakeholders of Construction Project and the Analysis of Interests and Needs

1) Stakeholders of pre-project and the analysis of interests and needs: The main tasks of the pre-project are investment decision, feasibility studies, preliminary design of the project construction plan, environmental impact assessment, budget estimate, etc., the work content during the period determines the main stakeholders: investors or owners, design contractor, the surrounding tissue and the public, government [9]. In this period, as the interests and objectives of the parties are different, their performance expectations and requirements of the project are also different. As investors or owners, they are most concerned about the investment return, thus they will play more attention at the function and role of the project, cost estimates, the feasibility, reasonableness, reliability and security of design; the design contractor is more concerned about whether their work to meet the requirements of owners maximize, whether the organization's reputation can be enhanced, whether the project cash can be paid timely, etc.; peripheral tissues and the public will need to get good placement of personnel, compensation costs higher; government hopes that the project construction consistent with national strategy, has good social and economic benefits, corresponds national policies and regulations.

2) Stakeholders of interim project and the analysis of interests and needs: The interim project mainly refers to the process from the specific implementation of the project until

completion and acceptance. The main task of this period is the planning and implementation of the project, it includes project construction; the resource investment of energy, materials, equipment, technology, etc.; the supervision of monitoring organization; the preparation and implementation of the project schedule, cost and quality plan; the inspection, assessment and control of the performance. Therefore, the main stakeholders of the construction phase are: owners, construction contractors, labour, supervision, suppliers, governments, organizations around the project and the public.

During the middle term, the owners are most concerned about that the three indicators of the project (cost, quality and progress) have been effectively controlled, they can be implemented according to the expected plan and have no deviation; as the contractor, whose main task is to construct according to the contract, what are they most concerned about is the payment of the engineering, project profits, the enhance of their own image, the relationship of the surrounding tissue, the change risks, etc.; the interests and needs of the project producers are mainly that whether the fruits of labour can be recognized, whether the wages can be timely paid, whether the working conditions are humanity and safety, etc.; the construction supervision concerns that whether the parties can perform tasks according to the contract, whether the collaboration and cooperation of the parties are harmonious, whether the progress of the project is successful, whether their own interests and the owners' interests are maintained, etc.; the suppliers are mainly concerned with the supply contract compliance, supplier prices and payment way, support services, supply risk management situation; the government mainly concern that the environmental problems caused by construction and construction irregularities; the surrounding tissue and public concern that the impact of the project on their production and living.

3) Stakeholders of post-project and the analysis of interests and needs: The post-project mainly refers to the operation and maintenance phase which is from the completion and transformation of the project until the repeal date. Therefore, the main direct stakeholders of the period are: user, owner and project managers; the main indirect stakeholders are: government, the surrounding tissue and the public.

During this period, the project has been completed and delivered to the owners, it will enter the profitable phase, in order to maximize the benefits, the owners will mainly concern the operating costs, operating profit, operating service reliability, security, maintenance and other indicators to ensure the project's preservation and value-added; the users are buyers and users of the project product, they hope that the product quality, functionality, price and service levels are all the best; project managers are more concerned about the treatment, work environment, organizational culture, personal development, etc.; the government mainly concerns the social problems of improving the local image, promoting local economic development, solving the employment, etc.; the surrounding tissue and public are more concerned about the improvement of the surrounding conditions, the impact of project operations on the surrounding ecology, air and water environmental, personal development space.

B. Construction Project Integrated Management Based on Stakeholders

1) Life-cycle Integrated Management of Construction Project: The project is divided into multiple stages in the implementation process; the latter stage of the work is based on the previous stage. One of the basic ideas of construction project integrated management is to integrate the various stages of the project life-cycle as a whole, obviously, ensuring adequate information exchange among all stages and the parties of the project is the basic conditions to ensure the life-cycle integration of the project[10]. The communication exchange of stakeholders in all stages has great significance for the success of the project; therefore, it should ensure the real-time information exchange among the different stages and different participants of the project life-cycle.

2) Multiple elements Integration Management of Construction Project: Traditional project management is the type of function management, the managers of different functions lack of effective communication. In the implementation of construction project integrated management, it should ensure the horizontal information exchange among different managers, including: data, files and information preservation, sharing and transfer; providing the information platform for the managers of different working groups to make real-time communication, discussion, decision-making and a collaboration work; making a unified plan, coordinating inter-departmental staff to complete work, and so on.

3) Information Integration Management of Construction Project: To The current project management practices still remain on the basis that all participants work by their own. All parties work within their own contract, and isolate mutually from other participants. In this information system, information flow is one-way, it doesn't exist communication and discussion in the internal and external of the project, the external participants lack of the necessary interaction, so no party can account the follow-up work into the constraints. The one-way information transmission often leads to various problems and contradictions, such as misunderstanding the needs of owners, improper interpretation of design documents, obsolete systems of equipment specifications, error plan execution of the project, inconsistent messaging, incompatible data formats and so on, so it often has to be reworked, but correction of the error causes more changes. In this management style, managers have to focus on the address emerging conflicts. The information system of construction project integrated management based on stakeholders will provide an information exchange platform for the professional participants to ensure the involved parties of the project to play their respective roles.

V. CONCLUSIONS

A distinctive feature of construction project management is the diversification of the organization and management, the whole process of planning, preparation, construction, completion and acceptance are inseparable from the input and participation of stakeholders. For the drawbacks of the traditional model, the study applies management integration and systematic thinking, regards the project as an organic system, proposes the approach of construction project integrated based on stakeholders, unifies all stages of the ideas

and conduct of stakeholders, balances the interests of all stakeholders comprehensively, strengthens the information exchange of stakeholders, improves the satisfaction of all parties, makes the project to create the greatest economic, social and environmental benefits.

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